

Reference Material

**REHS2362 – Special Instruction for Installing
PL1000E Communications Module**

**REN8091 – System Operation Troubleshooting
Testing and Adjusting PL1000E**

**REHS2125 - Special Instruction for Installing
PL1000T Communications Module**

**REN7945 - System Operation Troubleshooting
Testing and Adjusting PL1000T**

PL1000E (Explorer)

Features

Wiring

Configuration and Setup

Diagnostics & Troubleshooting

Features

**Modbus Parameter Translation
(RS-232, RS-422, RS-485, Ethernet)**

Cat Data Link

J1939

Simultaneous Translations

Embedded Communications Adapter

Embedded Webserver- status,configuration,& diagnostics

Cat Data Link Boost

User Configurable Parameter Translation

Wiring

Standard Wiring Harness

Power Connections

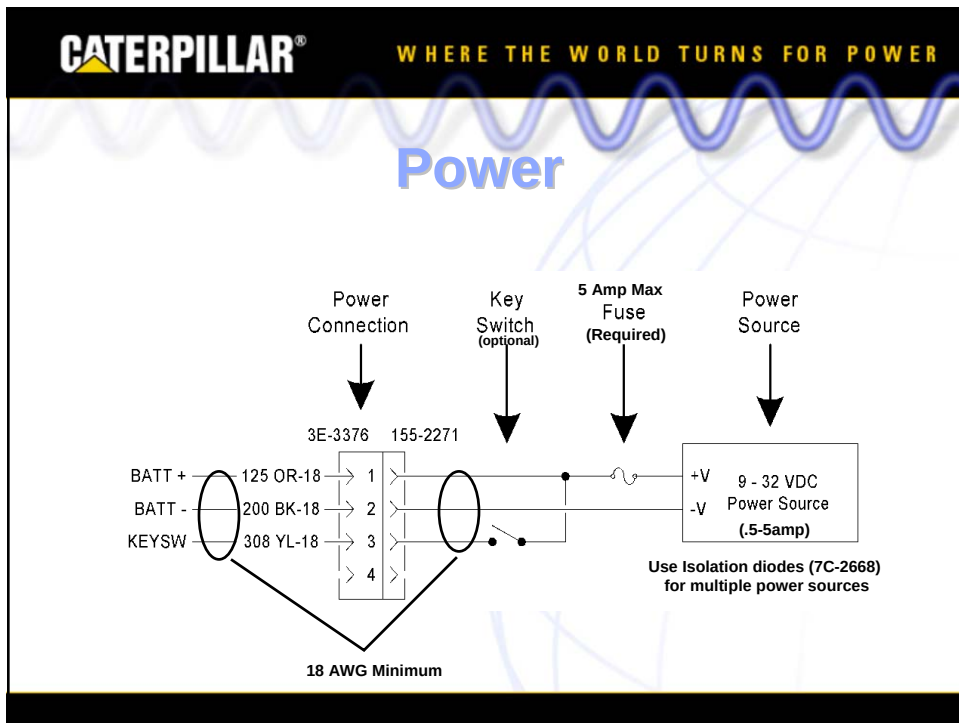
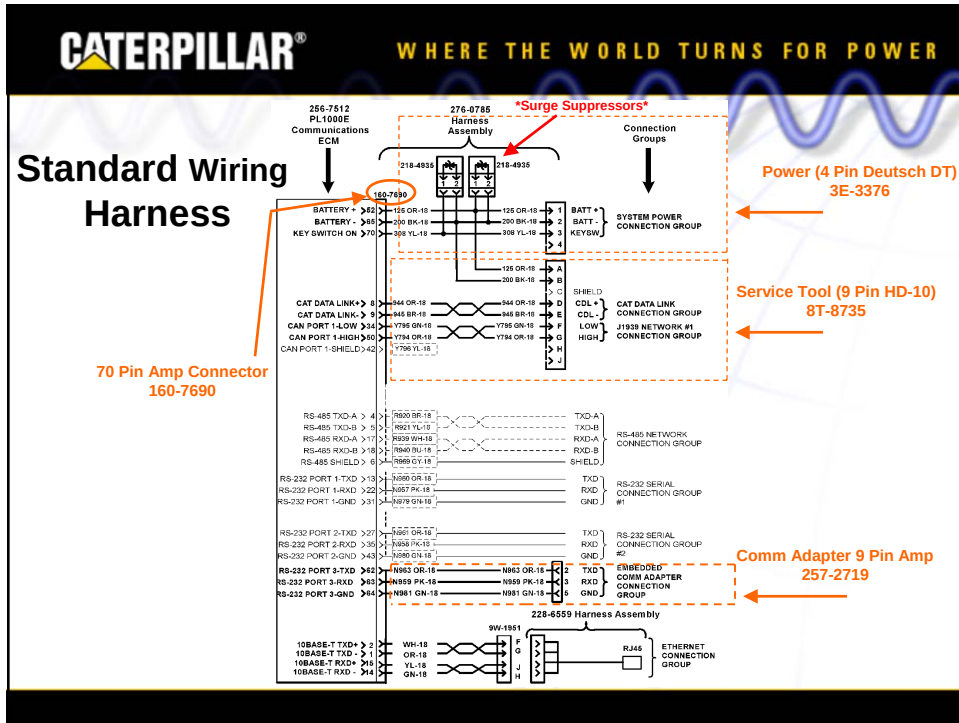
Cat Data Link

J1939

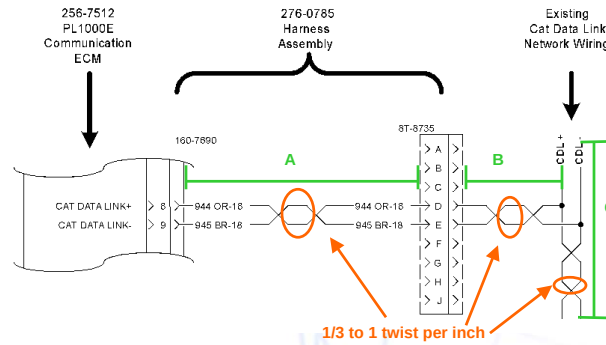
Embedded Comm Adapter and RS-232

Ethernet

RS-485/RS-422



CAT Data Link

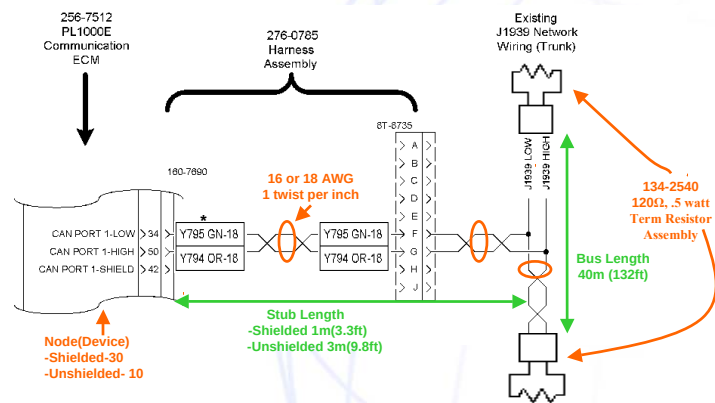


Total CDL network length is A+B+C and maximum under specified conditions:

- CDL Boost Enabled 300m(1000ft) with 18AWG
- CDL Boost Disabled 30m(100ft) with 16AWG

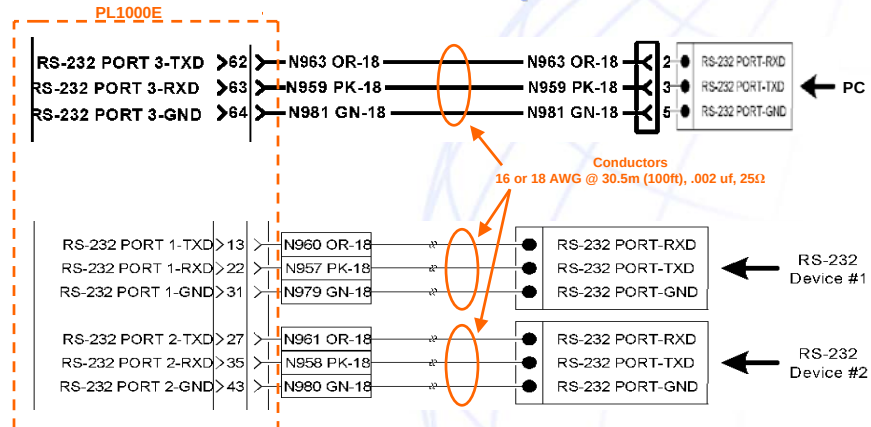
-11 Maximum devices maximum on the network

J1939

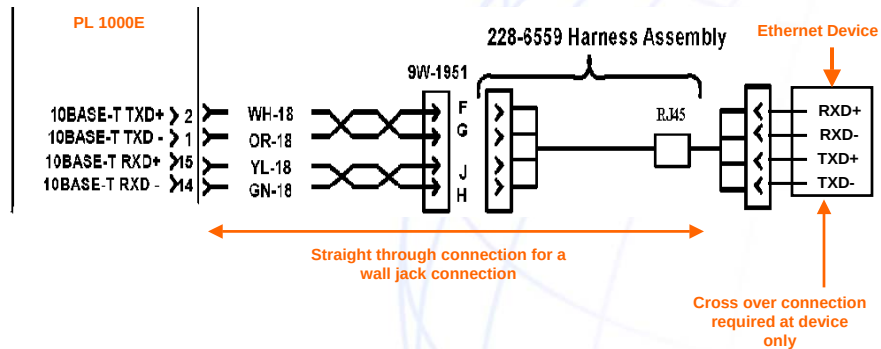


The distance between any 2 nodes is specified as .1m - 40m (.3ft - 98.5ft)

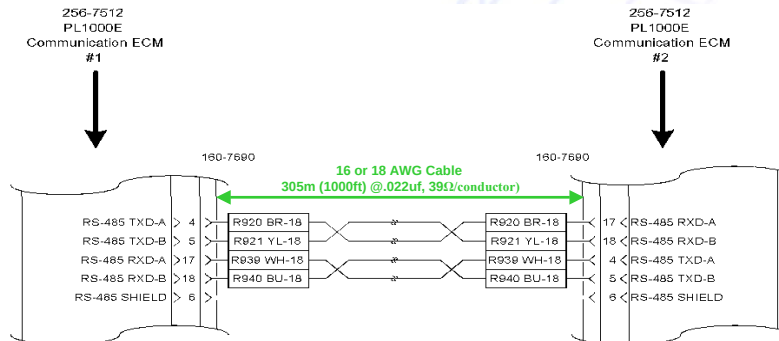
Embedded Comm Adapter and RS-232



Ethernet



RS-485

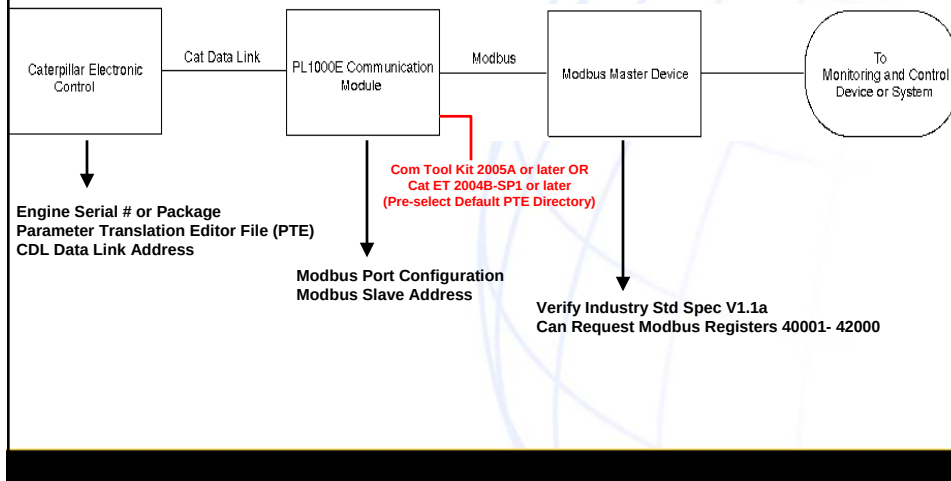


RS-422 4 wire can also be utilized using this same wiring scheme

CDL to Modbus Configuration

- Develop system diagram
- Gather device information and tools
- Prepare PCL File (Create Parameter Translation Design)
- Install PCL in PL1000E
- Verify Modbus Translation

System Diagram, Requirements, and Tools



Key Acronyms, Terms and Definitions

PTE – (Parameter Translation Editor). The feature in CTK or Cat ET which allows one to configure the PL1000E

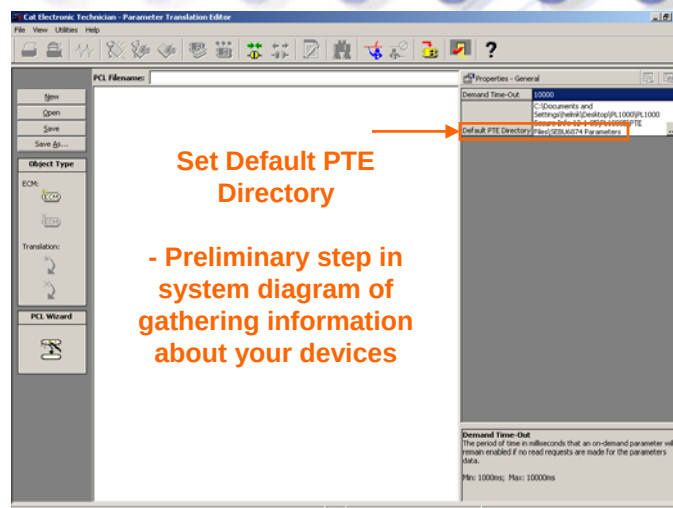
PTE File– (Parameter Translation Editor File). file which contains all parameters that can be translated. Unique to each engine or control panel family

PCL File – Parameter Configuration List File. User configurable file which defines the parameters for translation, method of translation and proper addresses.

Key Acronyms, Terms and Definitions

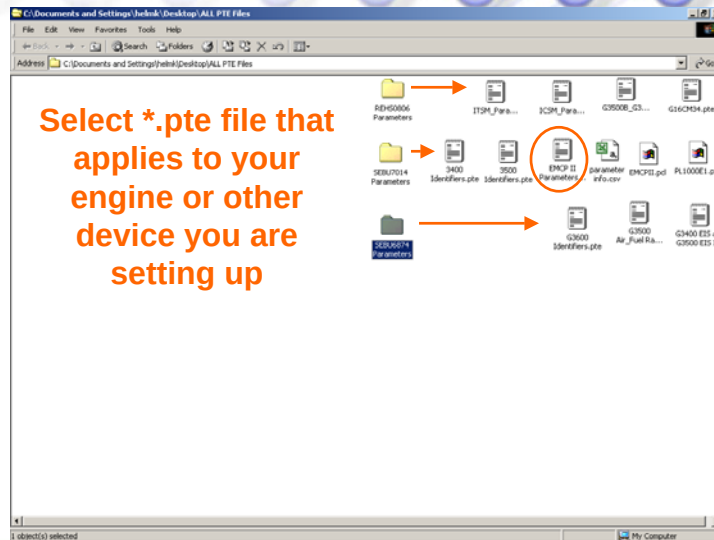
CTK – (Communications Tool Kit). A CD which comes with Each purchase of a PL1000. It is EERP1000. It contains the Installation and System Operations Test and Adjust Manuals for both the PL1000E and PL1000T. Additionally it contains the PTE files for all engine and control panel families. It gives the user the ability to configure the PL1000E or the PL1000T independent of Cat ET. CTK Version 2005A is the current version available as of Feb 2006.

Gather Information



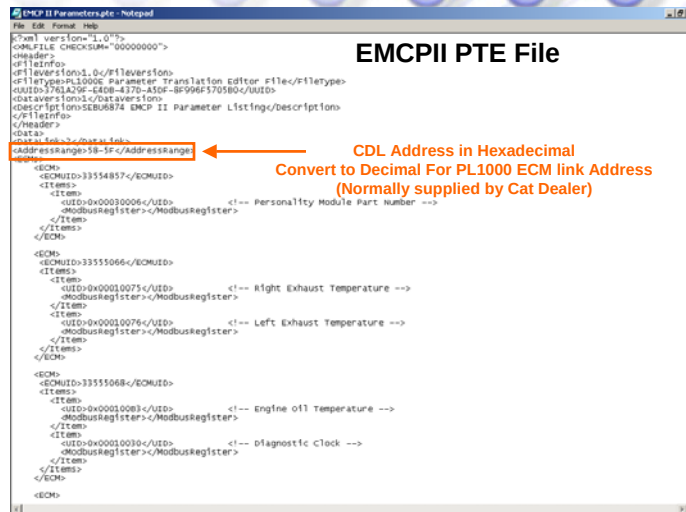
Gather Information

Select *.pte file that applies to your engine or other device you are setting up



Gather Information

EMCPII PTE File



Gather Information

3400 Engine PTE file

```
File Edit Format Help
c:\m1 version="1.0"
<MODULE CHECKSUM="00000000">
  <header>
    <?xml?>
    <FileVersion>1.0</FileVersion>
    <FileVersion>1.000 Parameter Translation Editor File</FileType>
    <GUID>66A181E6-6E30-4386-B74D-FC8B00A3329</GUID>
    <DataVersion>1</DataVersion>
    <Description>ECM0874 3400 Parameter Listing</Description>
  </?xml?>
  <?header?>
  <Data>
    <?ECM?>
    <AddressRange>36</AddressRange>
  </?Data?>
</MODULE>

<ECM>
  <ECMID>33554857</ECMID>
  <ITEM>
    <ITEM>
      <ID>0x00010006</ID> <-- Personality Module part Number -->
      <ModbusRegister></ModbusRegister>
    </ITEM>
    <ITEM>
      <ID>0x00010000</ID> <-- ECM Serial Number -->
      <ModbusRegister></ModbusRegister>
    </ITEM>
  </ITEM>
</ECM>

<ECM>
  <ECMID>33554860</ECMID>
  <ITEM>
    <ITEM>
      <ID>0x000101BC</ID> <-- Engine Configuration -->
      <ModbusRegister></ModbusRegister>
    </ITEM>
  </ITEM>
</ECM>

<ECM>
  <ECMID>33554874</ECMID>
  <ITEM>
    <ITEM>
      <ID>0x000102CB</ID> <-- Shutdown Emergency override -->
      <ModbusRegister></ModbusRegister>
    </ITEM>
    <ITEM>
      <ID>0x00010014</ID> <-- Coolant Level -->
      <ModbusRegister></ModbusRegister>
    </ITEM>
  </ITEM>
</ECM>

</ECM>
```

CDL ECM Address in decimal

Prepare PCL File

Start Cat ET

Add CDL ECM Object

Modify CDL ECM Properties

Add Modbus ECM Object

Modify Modbus ECM Properties

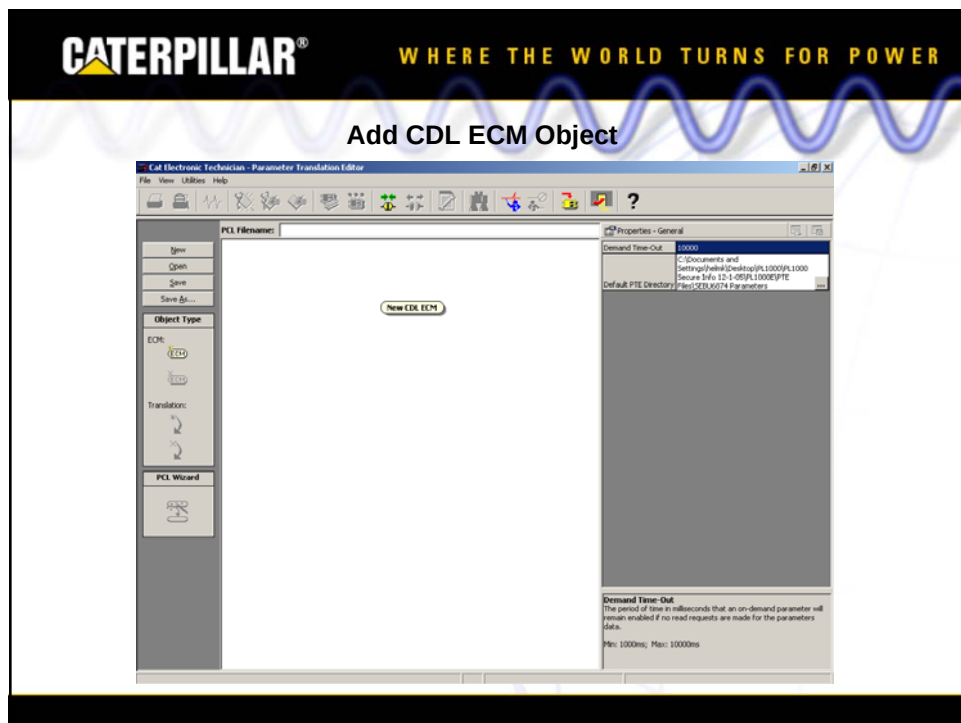
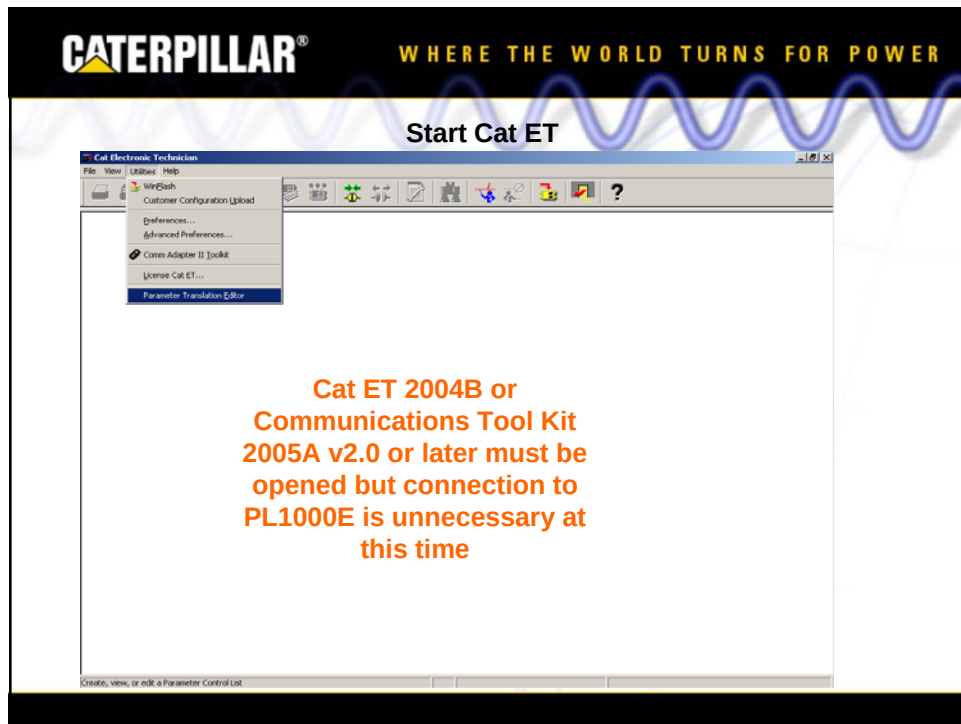
Add Translation Object Parameters

Assign Translation Object Parameters

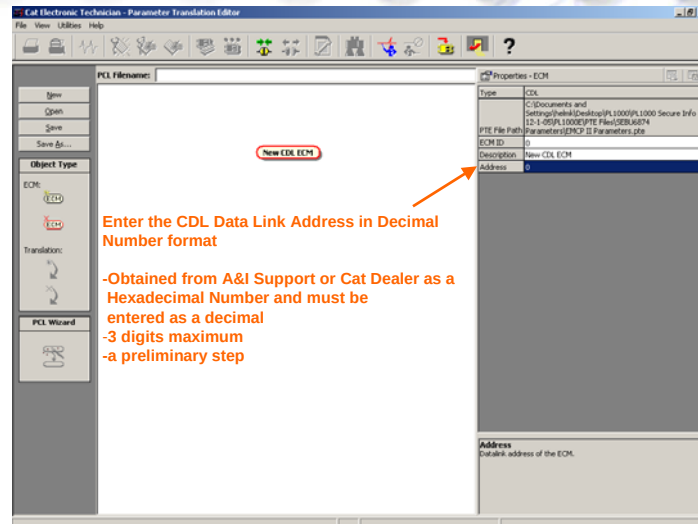
Modify Translation Object Parameters

Save Parameter List to a File (optional)

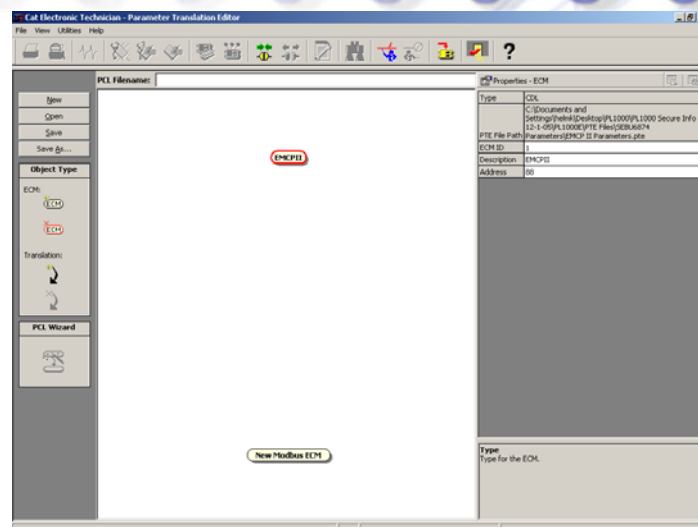
Save PCL File to a Disk



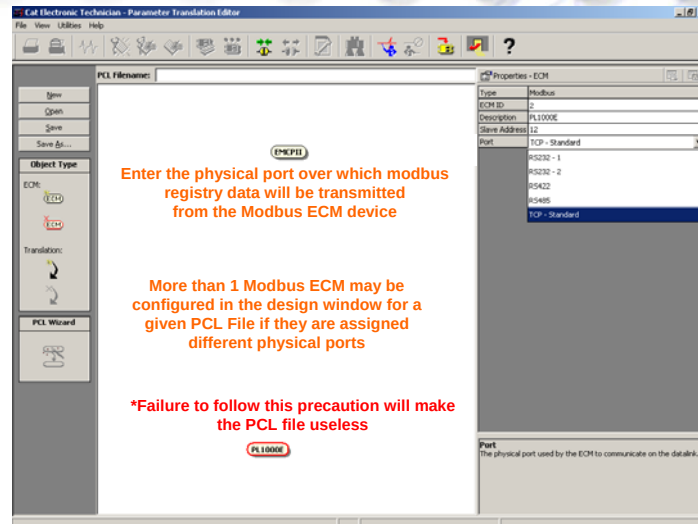
Modify CDL ECM Properties



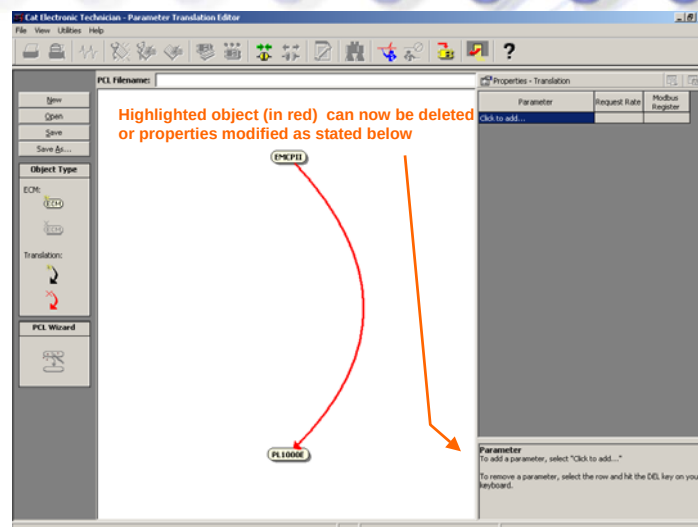
Add Modbus ECM Object



Modify Modbus ECM Properties



Add Translation Object



Assign Translation Object Parameters

List of selected parameters for translation with request rates from CDL Device and registers where parameter data is stored

Parameter	Request Rate	Modbus Register
AC Current	1000	400001
AC Voltage	1000	400005
AC Frequency	1000	400027
Battery Voltage	1000	400028
Generator Total Apparent Power	1000	400029
Generator Total Real Power	1000	400031
Generator Total Reactive Power	1000	400033
Engine Oil Pressure	1000	400036
Engine Oil Temperature	1000	400036
Active Events	1000	400037
Active Diagnostics	1000	400039
Engine Control Switch	1000	400041
Click to add		

Parameter
To add a parameter, select "Click to add..."
To remove a parameter, select the row and hit the DEL key on your keyboard.

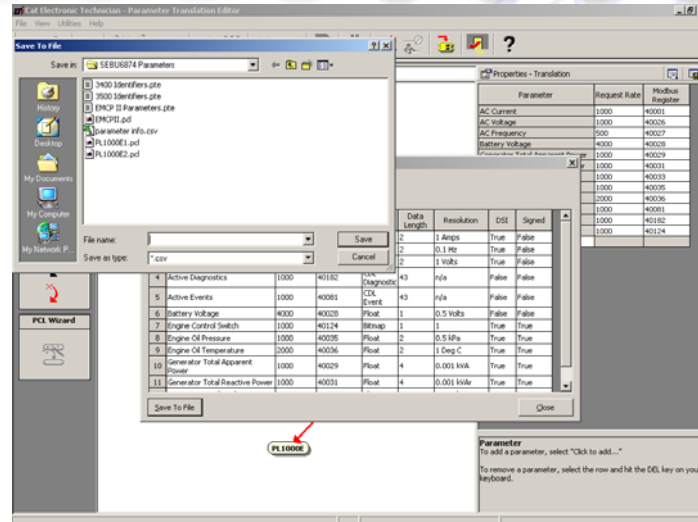
Modify Translation Object Parameters

Note: Parameter data is requested by the PL1000E at these rates if the ECM does not broadcast the data at a faster rate

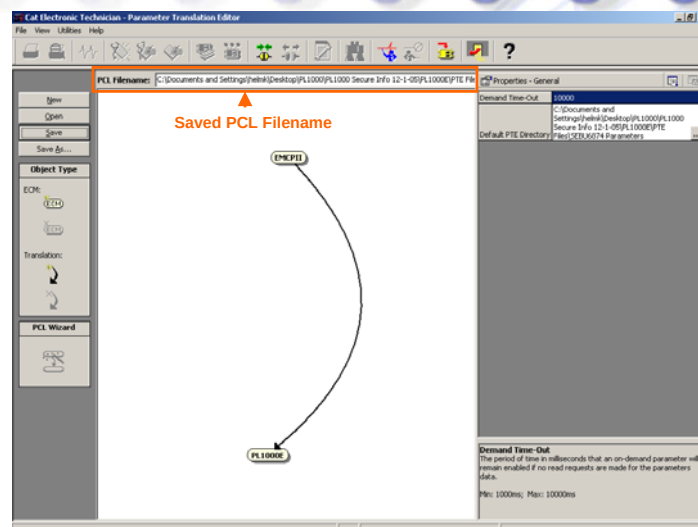
Parameter	Request Rate	Modbus Register
AC Current	1000	400001
AC Voltage	1000	400005
AC Frequency	500	400027
Battery Voltage	4000	400028
Generator Total Apparent Power	1000	400029
Generator Total Real Power	1000	400031
Generator Total Reactive Power	1000	400033
Engine Oil Pressure	1000	400036
Engine Oil Temperature	2000	400036
Engine Control Switch	1000	400041
Active Diagnostics	1000	400039
Active Events	1000	400037
Click to add		

Parameter
To add a parameter, select "Click to add..."
To remove a parameter, select the row and hit the DEL key on your keyboard.

Save Parameter List to a File (optional)



Save PCL file to a Disk



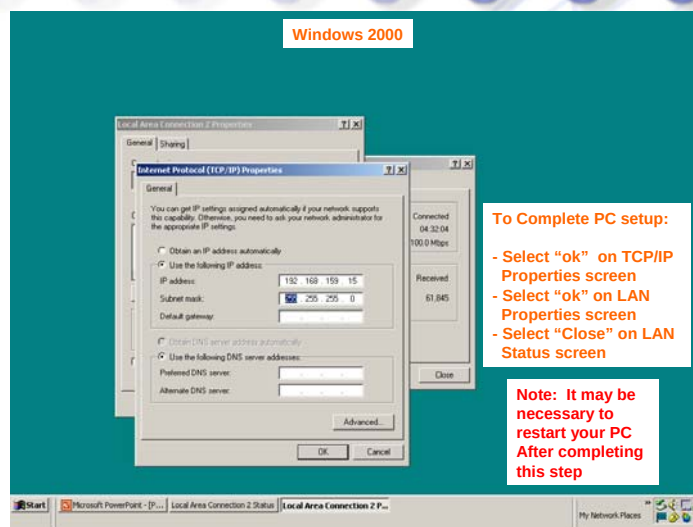
Install PCL File in PL1000E

(using Direct Crossover connection to a single PC)

- Configure PC to Access PL1000
- Establish an FTP Session

Configure PC to Access PL1000E

Windows 2000



To Complete PC setup:

- Select "ok" on TCP/IP Properties screen
- Select "ok" on LAN Properties screen
- Select "Close" on LAN Status screen

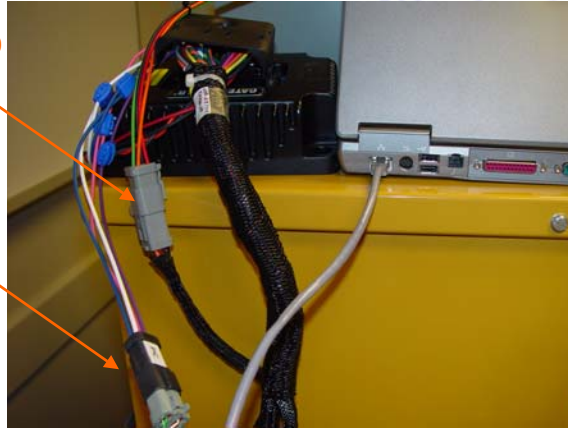
Note: It may be necessary to restart your PC After completing this step

Establish FTP Session using Standard Web Browser

Connect PL1000 to PC and CDL Device with Power

CDL to PL1000

PL1000 to PC



Establish FTP Session using Standard Web Browser

Verify Connection between PC and PL1000

```

C:\WPNT\system32\command.com
Windows 2000 IP Configuration
Ethernet adapter (148B9805-B492-4FC1-B98E-8769724F404):
    Connection-specific DNS Suffix : 
    IP Address . . . . . : 0.0.0.0
    Subnet Mask . . . . . : 0.0.0.0
    Default Gateway . . . . . : 
Ethernet adapter Local Area Connection:
    Connection-specific DNS Suffix : m.na.cat.com
    IP Address . . . . . : 192.168.159.15
    Subnet Mask . . . . . : 255.255.254.0
    Default Gateway . . . . . : 192.20.224.1
Ethernet adapter Local Area Connection 2:
    Connection-specific DNS Suffix : 
    IP Address . . . . . : 192.168.159.15
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 
C:\DOCUMENTS\NIELAND
    
```

Verify IP address and Subnet Mask assigned in Internet Protocol properties of LAN Connection

Establish FTP Session using Standard Web Browser

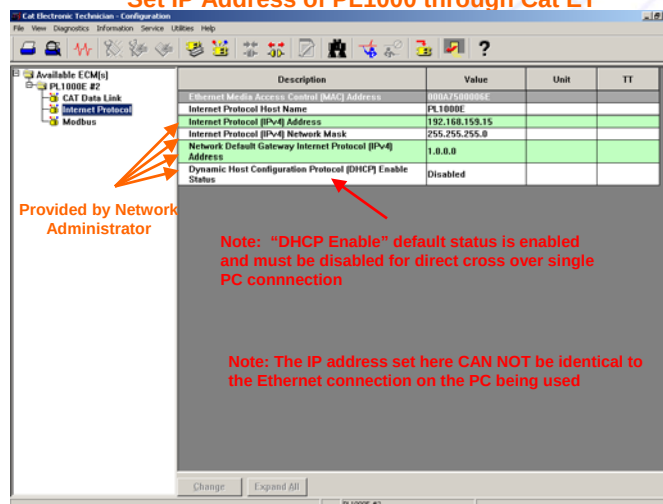
Physically Connect to PL1000 with Embedded Communications Adapter



Serial Port 3
From
PL1000

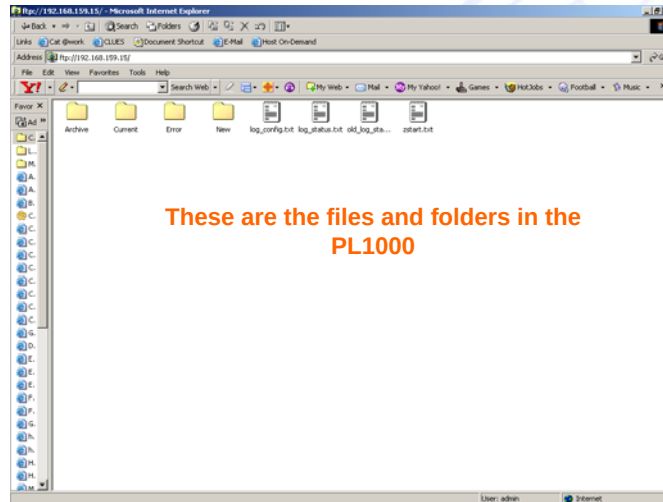
Establish FTP Session using Standard Web Browser

Set IP Address of PL1000 through Cat ET



Establish FTP Session using Standard Web Browser

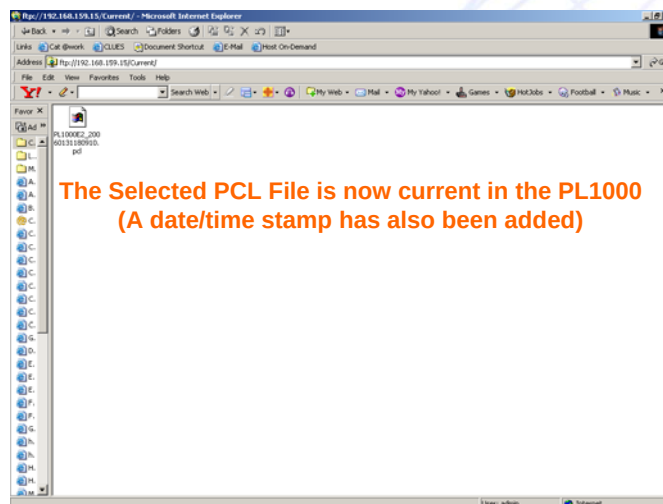
Access the PL1000's Files and Folders



These are the files and folders in the PL1000

Establish FTP Session using Standard Web Browser

Transfer Selected PCL File to PL1000



The Selected PCL File is now current in the PL1000
(A date/time stamp has also been added)

Verify Modbus Translation

Using Embedded Webserver

Using an Ethernet Test Program

Verify Translation using a Webserver



Verify Translation using a Webserver

Configuration Screen
(Data from Cat ET configuration)

***Note that "Password" and "Reset" Screens are not shown unless individually selected**

CATERPILLAR®

Home
Configuration
Status
Help

Expand All
Collapse All

Configuration All Parameters

00000

Ethernet TCP/IP Configuration

MAC Address	00:0A:75:00:00:6E
Host Name	PL1000E
IP Address	192.168.1.15
SubNet Mask	255.255.255.0
Default Gateway IP address	1.0.0.0
DHCP	☐ Enable ☒ Disable
DHCP Results	- assigned Hostname: - assigned Domain:

Modbus Configuration

TCP Address	5
Address	1
Port	☒ None ☐ RS232-1 ☐ RS232-2 ☐ RS422/485
Baud	☐ 1200 ☐ 2400 ☐ 4800 ☒ 9600 ☐ 19200 ☐ 38400
Address	255
Port	☒ None ☐ RS232-1 ☐ RS232-2 ☐ RS422/485
Baud	☐ 1200 ☐ 2400 ☐ 4800 ☒ 9600 ☐ 19200 ☐ 38400
Address	255
Port	☒ None ☐ RS232-1 ☐ RS232-2 ☐ RS422/485
Baud	☐ 1200 ☐ 2400 ☐ 4800 ☒ 9600 ☐ 19200 ☐ 38400
Address	255

CDL configuration

PL1000E Module ID (MID)	☐ A1 ☒ A2 ☐ A3
Boost	☐ Enable ☒ Disable

Verify Translation using a Webserver

PL1000E Communication Module - Microsoft Internet Explorer

Address: http://192.168.159.151/

CATERPILLAR®

Home
Configuration
Status
Help

Expand All
Collapse All

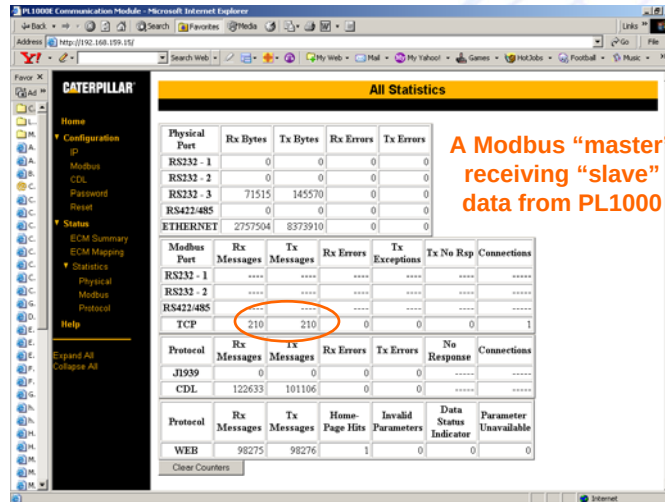
Configuration Reset

Submit

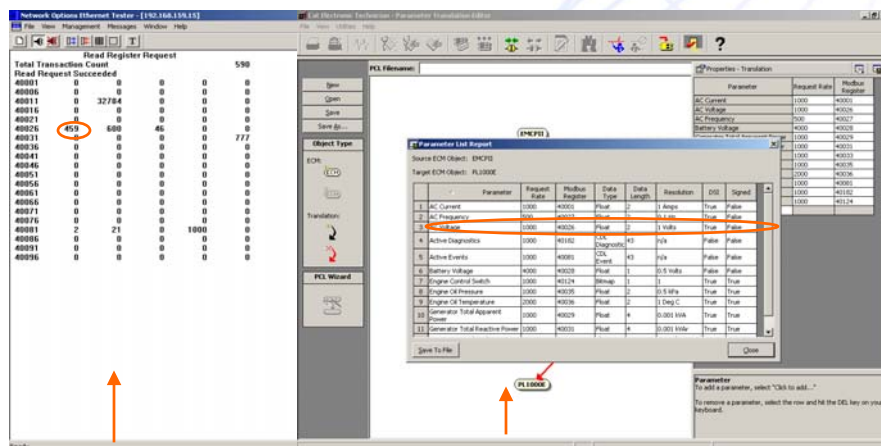
Reset Action
☒ Abort
☐ Reset

"Reset" performs a warm boot of PL1000
(similar to Ctrl Alt Delete for a PC)

Verify Translation using a Webserver



Verify Translation using an Ethernet Test Program



Diagnostics & Troubleshooting

**Wiring or connection errors
Addressing Issues
Browser Settings
PC Setup
Port Conflicts
Procedural Errors
Software Conflict (Cat ET, PL1000 CTK)**

Lab Exercise

**Set up and Configure
the PL1000E**

Future Enhancements

Customized Web Pages – March 2006

Modbus Master Capability – 2007

Included in C175 Packages

PL1000T (Translator)

Features

Wiring

Configuration and Setup

(Example CCM replacement)

Features

Module Replacement - Engine Vision, Global Position, Sea Water Module, Customer Communications Module

Cat Data Link Tunnel- Cat Data Link inside J1939 envelope

Embedded Communications Adapter

J1939 Extension Bridge- combine 2 J1939 networks to 1

Can Extension Bridge – combine 2 J1939 networks to 1 using 2 PL1000T's

Standard Wiring Harness

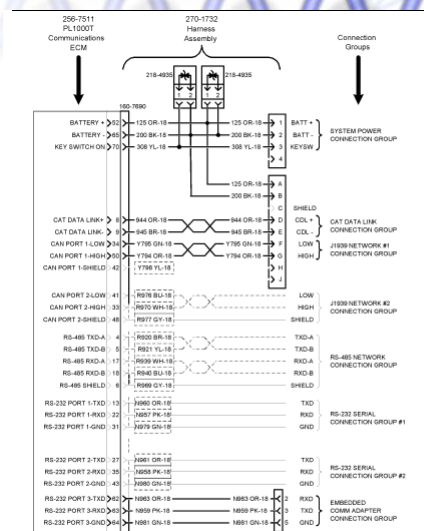


Illustration 9

Solid bold lines represent the connections provided by the 270-1752 Harness Assembly. Lighter lines and dashed lines represent the optional connections available for custom harnessing to meet the needs of your application.

Configuring the PL1000T as a CCM Replacement

1. Connect the PL1000T embedded comm. adapter to the PC.
 - a. Use the longest serial cable from the PL1000T. This should be serial port 3. It is an RS-232 cable with a 9-pin connector and connects to pins 62,63,and 64 on the PL1000T. Refer to RENR 7945 page 17 illustration 9. This cable comes standard with a 9 pin connector and is included in the harness 270-1732.
 - b. Plug this cable into the serial port of the PC- probably com1. If the PC only has a USB Port, use USB to Serial adapter 237-7547. Not all USB adapters in all PC configurations will work.
2. Connect Power and Cat Data Link to the PL1000T
This should be a 4 pin Deutsch connector matched to the existing wiring of the CCM. Again reference RENR 7945 page 17.
3. Configure ET 20004B or Later to communicate with the PL1000T via the embedded communication adapter through 'preferences'
4. Connect to the PL1000T and configure the PL1000T.
 - a. Go to 'service' then 'configuration' after selecting the PL1000T as the ECM.
 - b. Open up the CCM selection and select port for configuration. Use serial 1 or 2. These ports do not come wired as part of the standard wiring harness of the PL1000T. They must be custom wired.
 - c. Set up the communication protocol to match the existing CCM. TYPICAL SETTINGS: Baud -9600, Stop bits - 1. Data Bits - 8 Parity -None. Communication Type - Direct.
5. Disconnect and Power Down the PL1000T.
6. Reconnect the PC to the PL1000T using selected SERIAL Port cable
7. Connect a 9 pin female to 25-pin male cable to the selected serial cable of the PL1000T.
8. Connect the cable in 'a' to a 25 pin female to 9 pin female cable. Connect the cable in 'b' to the communications port of the PC.
9. Open CCM PC software version 1.5 or later to communicate with the GSC of the EMCP II

The PL1000T will look like a CCM to the software and PC